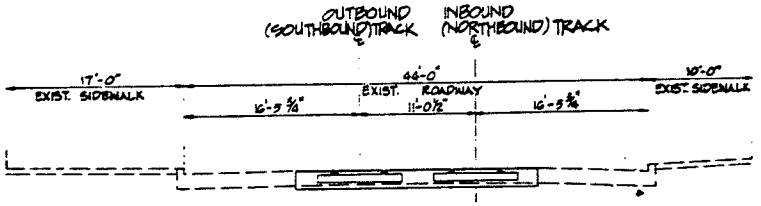
J LINE CONNECTION PROJECT

U.S. Department of Transportation
Urban Mass Transportation Administration and
San Francisco Department of City Planning

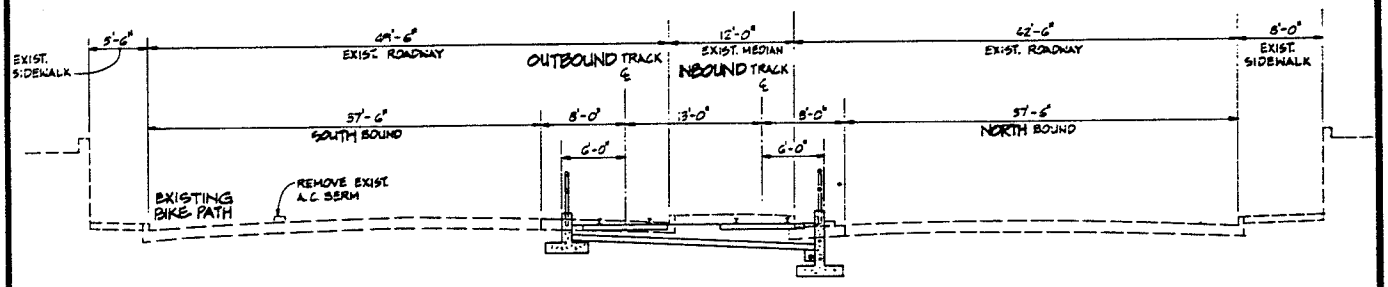
San Francisco, CA

FINAL
Environmental Impact Statement

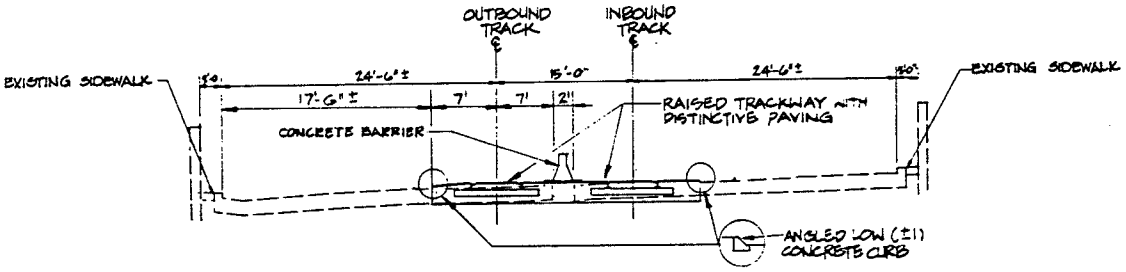
MAY 1983



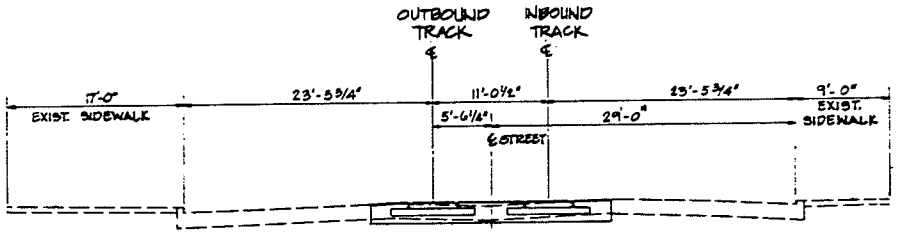
a. 30TH ST. AT DOLORES ST.



b. SAN JOSE AVE. IN BERNAL CUT NORTH OF HIGHLAND AVENUE



c. SAN JOSE AVE. AT I-280 UNDER CROSSING



d. SAN JOSE AVE. AT PAULDING ST.

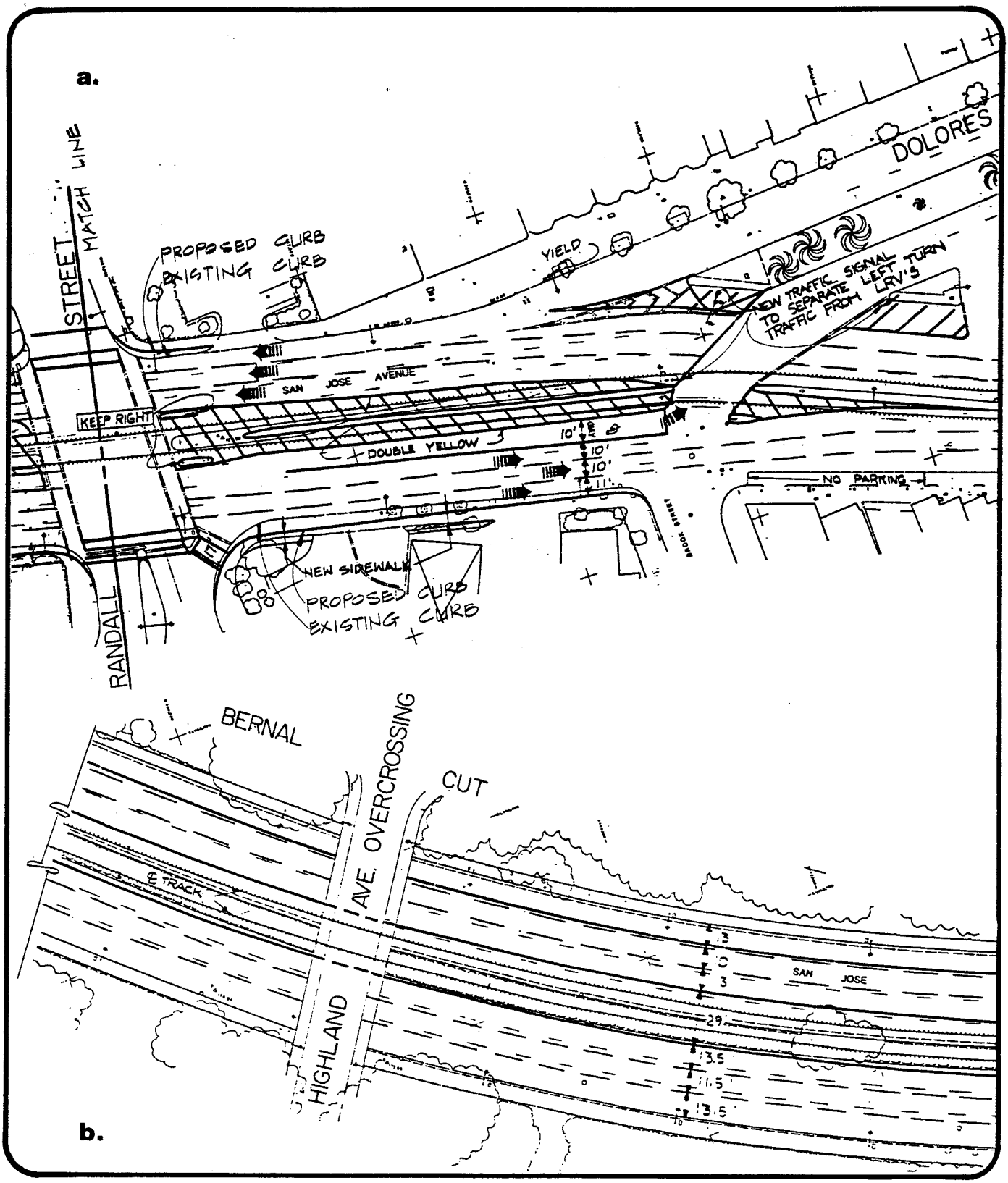
Typical Cross Sections

North

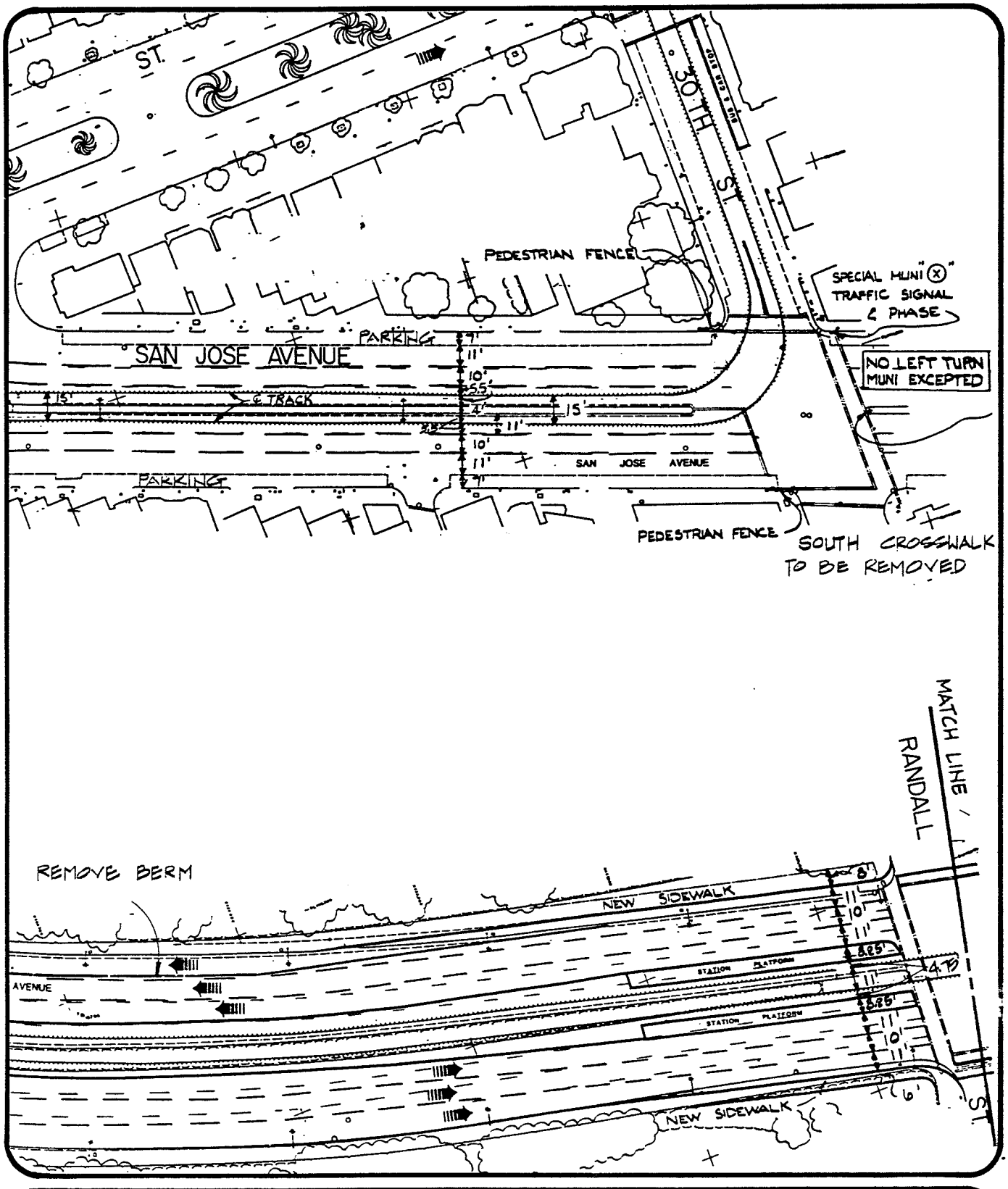
0 6 12 24

Scale

Figure No. 2 a-d



Randall Street Area



a. SAN JOSE AVENUE ALIGNMENT – RANDALL STREET TO 30TH STREET

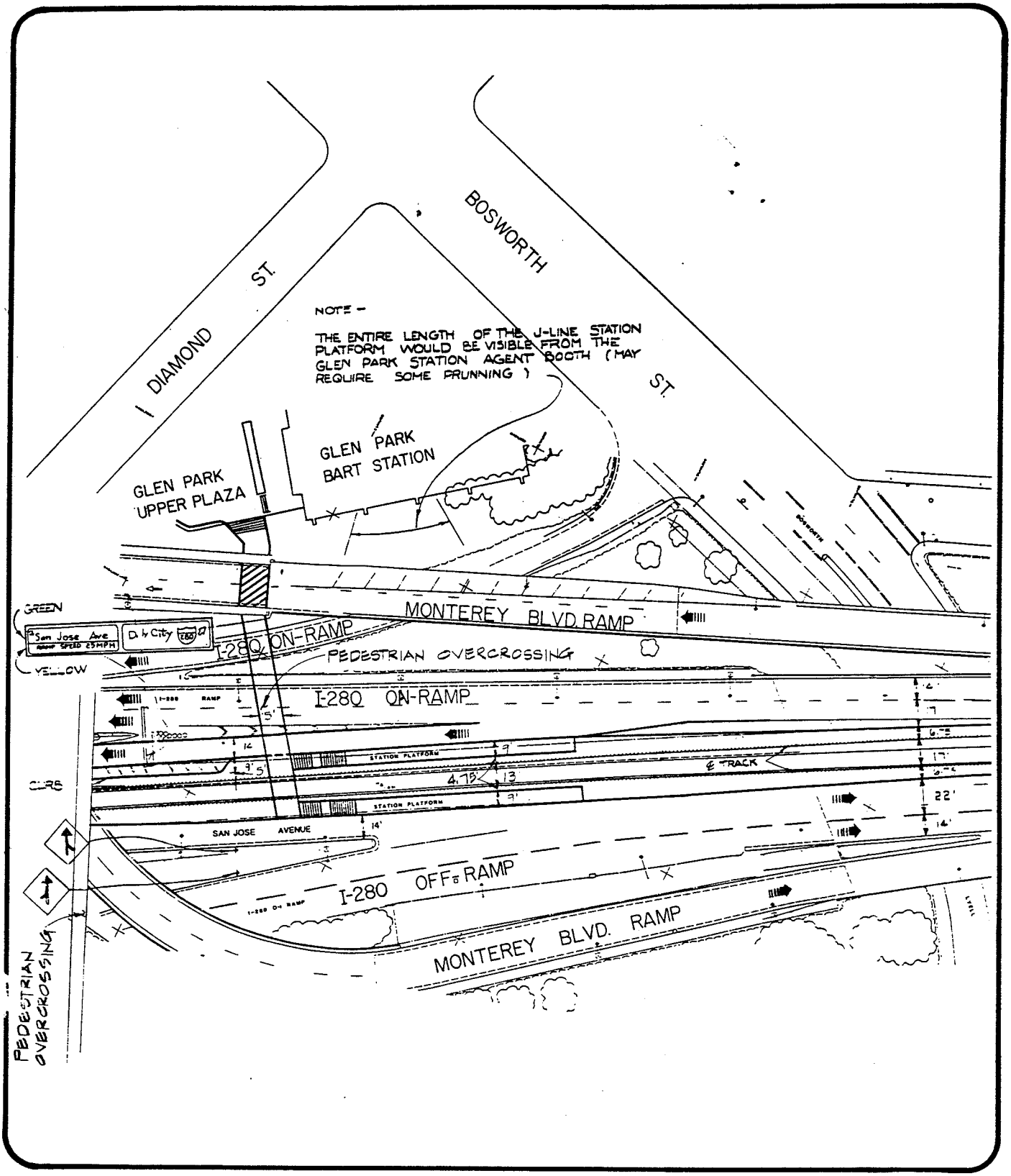
b. RANDALL STREET STATION AREA

North

0 10 20 40

Scale

Figure No. 3 a&b



Glen Park Areas

North

0 10 20 40

Scale

Figure No.4

J LINE CONNECTION PROJECT

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DRAFT

Environmental Impact Statement

October 1982

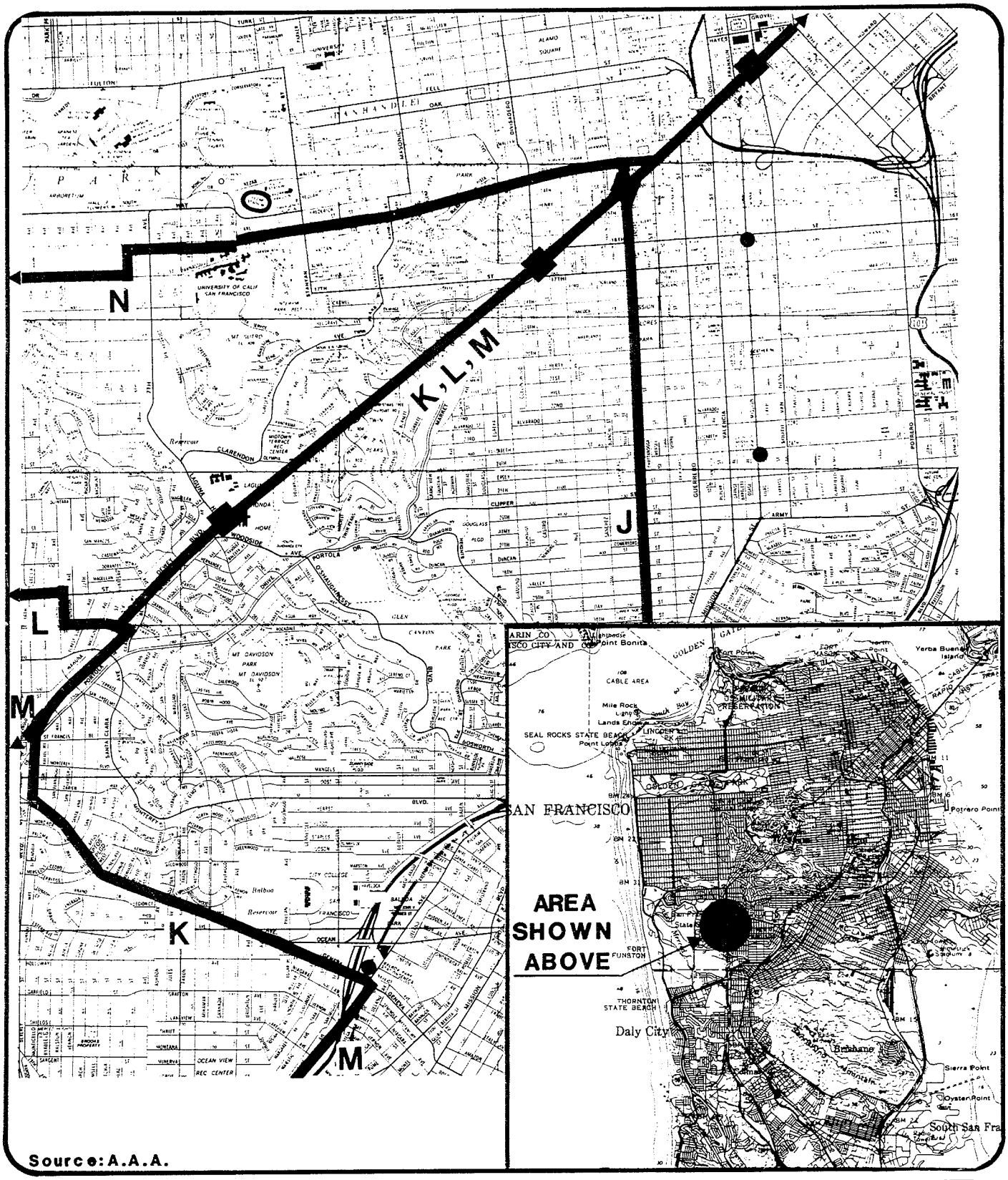
I. PURPOSE OF AND NEED FOR ACTION

The San Francisco Municipal Railway (Muni) operates five high capacity streetcar lines which are being modernized and upgraded. The J-Church, K-Ingleside, L-Taraval, M-Oceanview and N-Judah lines, shown in Figure 1, page 2, constitute an important element of the downtown-oriented radial service to and from the Twin Peaks and Sunset areas of the City. It is typical of radial routes that there is a heavy directional demand on these lines for inbound service during the morning commute hours and for outbound service during the evening commute hours.

To meet these demands efficiently extra vehicles are added to serve critical commuter passenger volumes. Service originating at the outer line terminals is supplemented during the morning commute, as is afternoon service originating at The Embarcadero Station. Placing these extra cars into service and removing them from service after the commute hours produces additional operational costs in the form of vehicle usage and employee time. On the N and J lines, the Metro LRVs (light rail vehicles) are stored in the car barn located at San Jose and Ocean Avenues (see Figure 1, page 2); from there, they must travel the K-line route through the Twin Peaks Tunnel to The Embarcadero Station and then to Judah Street or to 30th and Church Streets. This movement of the vehicles known as "pulling out" and "pulling in."

Muni has determined that the J Line Connection project is needed for the following reasons:

1. Revenue service would provide a connection linking the Mission District with the southern portion of the City. If J line service were extended past Balboa Park over the M line as proposed, J line riders could continue not only to Glen Park and Balboa Park, but also to San Francisco State University and the Stonestown Shopping Center.



Regional Location

- EXISTING STREETCAR ROUTES
- K — BART STATION
- MUNI METRO CAR BARN
- MUNI METRO STATIONS

North

0 500 1000 2000

Scale Feet

Figure No. 1

2. Additional service to riders at lower costs to Muni. Allowing J and N cars to be placed into and taken out of service via the J line Connection would provide the convenience of additional peak-period service to J line riders while reducing Muni's operating costs. In addition, by providing service on the J line to a larger area of the City, Muni may be able to justify increased service levels, resulting in shorter waiting times, particularly in off-peak hours.

3. Provision of a K, L and M detour route. In the event of a line blockage in the Twin Peaks Tunnel, K, L and M cars would have an alternate route available to and from the Market Street subway via Church Street.

4. Reduction of impacts on Chenery Street and Ocean Avenue. Impacts on Ocean Avenue resulting from operation of all J and N, as well as K and L, pull-in and pull-out cars would be reduced. In addition, the 26 diesel coach line would become a more community-oriented service, reducing noise and other impacts of motor coach operation on Chenery Street.

5. Improved service for Glen Park. At Glen Park the line as proposed would connect with four other Muni lines and BART. Glen Park residents would have direct Muni Metro service both to downtown and to San Francisco State and Stonestown.

The J Line Connection has been considered, planned and debated for over nine years. The first public meeting with neighborhood groups was arranged by the Muni Transit Improvement Program staff on November 1, 1972, and since then numerous community meetings have been held to discuss the Connection and possible alternatives. In 1975, the Muni Transportation and Coordinating Committee awarded Wilbur Smith and Associates a contract to conduct the Planning, Operations, Marketing (POM) study,[1] which defined the proposed J Line Connection and selected it from among six alternative linkages then under consideration. The report was released in 1977.

Community meetings and meetings with other agencies generated the two alternative alignments that are now being considered along with the POM study's recommended San Jose Avenue Alignment and the No-Build Alternative.

An Initial Study[2] was undertaken of the proposed alignments and the results were published in March, 1981. The study was circulated for comment among agencies and interested individuals and groups, and on May 27, 1981, the results were presented and discussed at two Environmental Scoping Meetings. Comments from interested parties were heard or submitted in writing and evaluated; significant and insignificant environmental issues were identified. On the basis of the Initial Study, the Scoping Meetings, and the comments, work proceeded on a Draft EIS/EIR.

The Urban Mass Transportation Administration (UMTA) and the San Franciso Department of City Planning have published the combined Draft EIS/EIR. This document will receive a minimum 45-day review and comment period. A public hearing on the Draft EIS/EIR will be held before the City Planning Commission (CPC) and UMTA. Responses will be prepared to written comments received by DCP and UMTA and to oral comments made at the public hearing. A Certification Hearing will be held by the CPC to determine the adequacy of the EIR. When the document is approved by UMTA, a Final EIS will be published and copies circulated to federal agencies, and the public.

In the event that the project moves forward to the design and construction stages, a period of about six months would be expected to be required for the preparation and review of plans and specifications for bidding. About three months would be needed for preparation, review and approval of bids. Construction would take about two years. Some utility relocation could be completed prior to construction of the tracks.

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[1] San Francisco Municipal Railway, Transportation Project: Planning, Operation, Marketing New Track Linkage N-J Lines, October 1977. A copy of this report is available at the Department of City Planning, 450 McAllister Street, and at Muni Planning Library, 949 Presidio Avenue, San Francisco, California.

[2] A copy of the Initial Study is available at the Department of City Planning, 450 McAllister Street, San Francisco, California.

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. DEVELOPMENT OF ALTERNATIVES

A study of alternative plans that would reduce the unproductive movement of Muni vehicles was prepared in the 1977 POM Study.[1] That study noted particularly high operational costs associated with pulling out and pulling in on the J-Church and N-Judah lines. The inauguration of LRV traffic in the Market Street Tunnel eliminated use of the 11th Street "Y" turnaround, thus increasing the unproductive distance to be traveled on the J line from 8.8 miles to 11.9 miles, and on the N line from about 10.8 miles to 14.6 miles.

To reduce these costs, six alternative plans to modify Muni trackage or operations were analyzed. Alternative 1, the Van Ness Crossover, involved operational changes only. Alternatives 2 to 6 involved new track linkages. Alternative 3, the San Jose Avenue Alignment, is examined in this EIS/EIR, as well as the Mission Street and Monterey Boulevard Alignments, and the No-Build Alternative. A complete examination of Muni's pulling-in and pulling-out operations and a preliminary investigation of the six proposed alternatives can be found in the 1977 POM study.

Alternative 1 of the POM study entailed using the crossover facility west of the Van Ness Station in the Market Street Tunnel. This proposal was rejected for several reasons: the reversing procedure could have potentially disrupted regular service; the plan would not relieve traffic in the Twin Peaks Tunnel nor offer alternative routing flexibility should the tunnel be blocked; safety and personnel factors weighed against this alternative; finally, it would add no new revenue service to the system.

Alternative 2 proposed using the existing 17th Street surface tracks to reduce the distances currently involved in pulling in and pulling out and to eliminate congestion and potential passenger-service disruption in the Market Street Tunnel. This plan was also

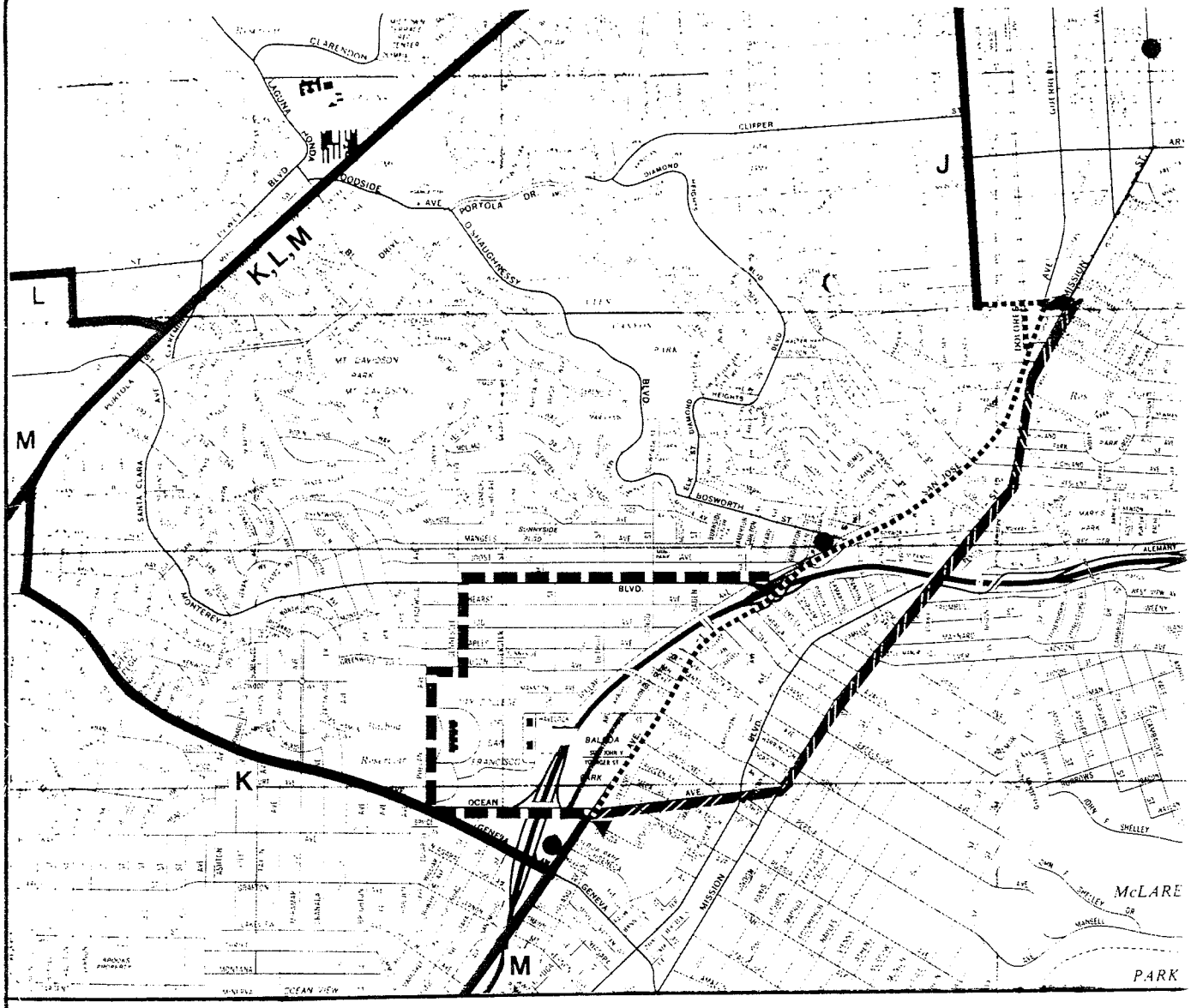
rejected for a number of reasons: it would fail to relieve traffic in the Twin Peaks Tunnel; it would necessitate a complex interface with the Market Street Tunnel signal system; it would reintroduce rail vehicles to street traffic at the Market Street intersections of Church and Castro Streets; and it would fail to generate revenues.

Alternative 3 proposed new track and overhead wires along San Jose Avenue from the existing J-line terminal at 30th Street to the Muni car barn at Ocean Avenue. This alternative was selected by the POM study consultants because it provided a shorter pull-out/pull-in time and distance for the J and N lines and reduced traffic and potential delay in the Twin Peaks and Market Street Tunnels by rerouting such operations outside of the tunnels. This alternative also offered an emergency rerouting possibility for traffic on the K, L, and M lines if the Twin Peaks Tunnel were blocked or otherwise out of service. The consultants recognized in this alternative the potential for revenue service along the J Line Connection, as well as elimination of duplicated service on parts of the 26 coach line. The possibility of a J-M double through-loop was also evaluated. This type of connection would allow J line cars to continue onto the M line (and vice versa) without having to turn around at the car barn.

Alternatives 4, 5 and 6 dealt with possible track linkages between the L line and the N line at Sunset Boulevard, at 46th Avenue and at the Lower Great Highway, respectively. While the specific reasons for rejecting each alternative varied somewhat, the considerations involved: significant reduction of traffic flow; elimination of parking spaces; possible safety problems associated with driveways and LRV traffic; failure to eliminate track conflicts at the West Portal Tunnel entrance; incomplete reduction of out-of-service traffic in the Twin Peaks Tunnel; and failure to generate revenues. In the case of Alternative 6, there were noticeable visual and other impacts on the Lower Great Highway and the lineal park, as well as safety problems associated with interfacing a single-track line segment with double-track lines.

B. DESCRIPTION OF ALTERNATIVES

Muni proposes to connect the present terminal of the J-Church streetcar line at 30th and Church Streets with the Muni Rail Center at Ocean and San Jose Avenues. Muni also proposes operationally to interline the J and M lines to form a loop route. Three alternative routes (Figure 2, page 7) are being considered. Each route would be constructed within street rights-of-way.



..... SAN JOSE AVENUE ALIGNMENT

MISSION ALIGNMENT

MONTEREY BOULEVARD ALIGNMENT

EXISTING STREETCAR ROUTES

K BART STATION

▲ MUNI METRO CAR BARN

Site Location Map showing Alternative Alignments

North

0 500 1000 2000

Scale Feet

Figure No. 2

1. San Jose Avenue Alignment Alternative[2]

This alignment would be routed from 30th and Church Streets via 30th Street and San Jose Avenue to Ocean Avenue, and would be 2.3 miles in length. A subalternative considers routing the alignment from 30th Street, along Dolores Street to San Jose Avenue, and would 2.2 miles in length.

2. Monterey Boulevard Alignment Alternative

This alignment would be routed from 30th and Church Streets via 30th Street, San Jose Avenue, Monterey Boulevard, Gennessee Street, Judson Avenue, Phelan Avenue and Ocean Avenue, and would be 3.3 miles in length.

3. Mission Street Alignment Alternative

This alignment would be routed from 30th and Church Streets via 30th Street, Mission Street and Ocean Avenue, and would be 2.5 miles in length.

4. No-Build Alternative

The No-Build Alternative would maintain the present system of operations (i.e., J line cars would traverse the Twin Peaks Tunnel to be placed in service).

C. EVALUATION OF ALTERNATIVES

This section evaluates the three proposed alternative alignments and the No-Build situation. Since all three alignments share a number of similar or equivalent impacts, initial discussion of these similar impacts will aid in the subsequent discussion of the different impacts presented by each proposed alignment. Table 1, page 9, presents a comparison of the alternatives.

1. Impacts Common to the Three Proposed Build Alternatives

All proposed alignments would be located in existing street rights-of-way or in existing medians. There would be no direct impact on existing land uses and zonings. There would be potential for indirect impacts on land use. The service improvement in and to the affected areas would not have an immediate impact on their current compositions, which are single and multi-family residential neighborhoods interspersed with some commercial

III. AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

A. LAND USE AND URBAN DESIGN

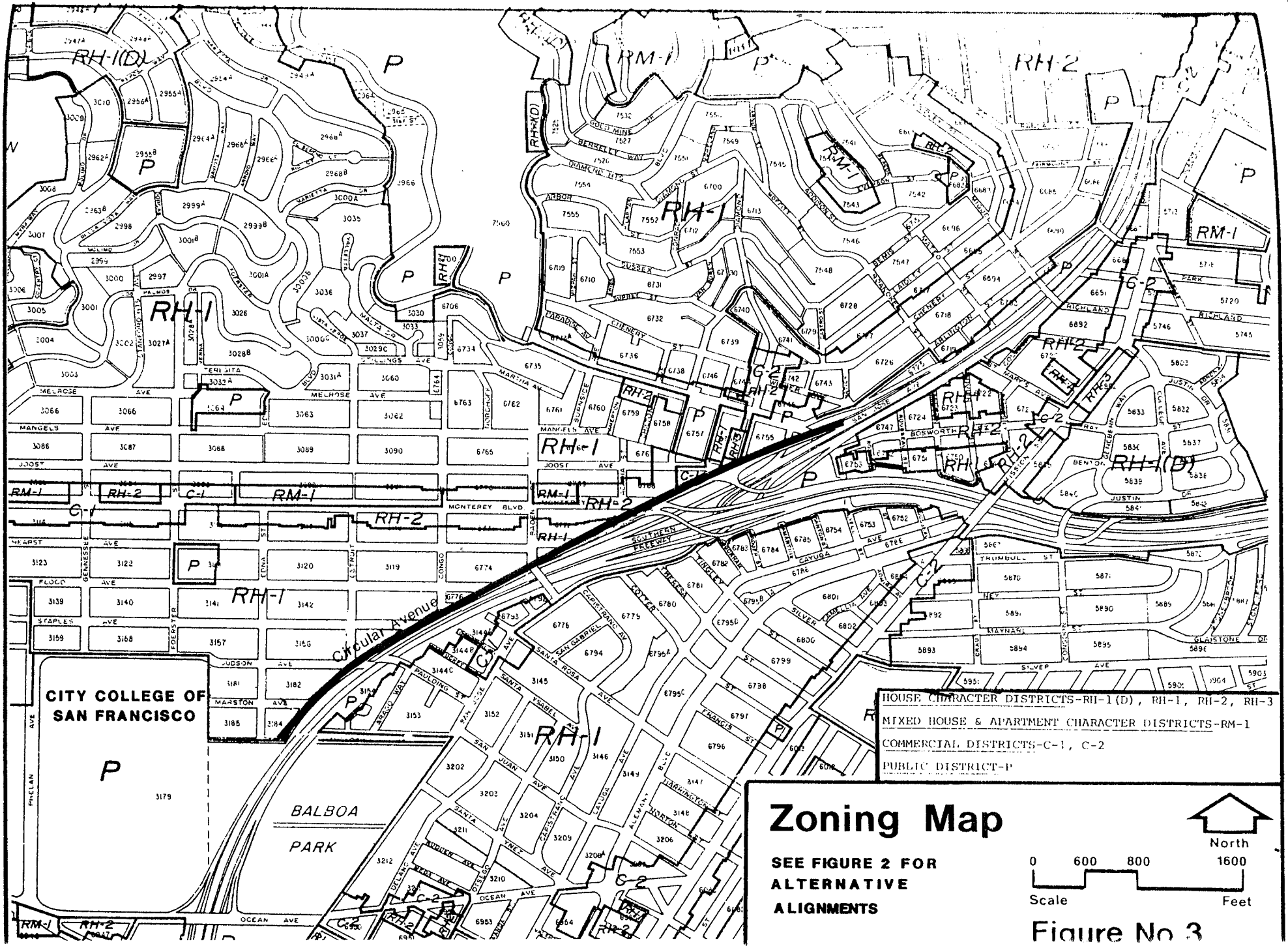
1. Land Use and Zoning

a. Zoning Classification and General Plan Designation

The alignments of the alternative connections are located in the public rights-of-way. The San Jose Avenue Alignment traverses public (P), single family and two family residential districts (RH-1 and RH-2) and commercially zoned districts (C-1 and C-2). The Mission Street Alignment traverses single family, two family and three family residential districts (RH-1, RH-2 and RH-3) and commercially zoned districts (C-1 and C-2). The Monterey Boulevard Alignment passes through single family, two family, three family and low density residential districts (RH-1, RH-2, RH-3 and RM-1 respectively). This alignment also traverses public (P) and commercially zoned districts (C-1 and C-2). In some instances an alternative alignment would run on the edge of two zoning districts. This occurs in a few places on each of the alignments: on the San Jose Avenue Alignment at Balboa Park and near Santa Rosa Avenue; on the Mission Street Alignment near Randall Street, at Cuvier Street and along Ocean Avenue at Cayuga and Delano Avenues; and on the Monterey Boulevard Alignment, near Monterey Boulevard. The General Plan designation in the corridor area is basically the same as the zoning classifications. Zoning classifications and General Plan designations for the study area are shown in Figure 3, page 21.

b. General Corridor

The neighborhoods which either adjoin or are partially affected by the project alternatives include Bernal Heights, Excelsior, Outer Mission, Ingleside, Westwood Park, Glen Park and Noe Valley (see Figure 4, page 22). The project corridor area extends from approximately 30th Street on the north to Geneva Avenue on the south and includes the areas adjacent to and between San Jose Avenue and Mission Street. The area between Monterey Boulevard and Phelan and Ocean Avenues is also included.


CITY COLLEGE OF SAN FRANCISCO
BALBOA PARK
Circular Avenue
SOUTHERN FREEWAY
MONTEREY BLVD
OCEAN AVE
HOUSE CHARACTER DISTRICTS-RH-1(D), RH-1, RH-2, RH-3
MIXED HOUSE & APARTMENT CHARACTER DISTRICTS-RM-1
COMMERCIAL DISTRICTS-C-1, C-2
PUBLIC DISTRICT-P
Zoning Map
SEE FIGURE 2 FOR ALTERNATIVE ALIGNMENTS
North
0 600 800 1600
Scale Feet
Figure No 3

All of the neighborhoods in the corridor area are single- and multi-family residential with some commercial and institutional uses occurring along major arterials. The largest amount of commercial use in the corridor area occurs along the Mission Street Alignment. Much of the northeastern portion of the corridor begins in the southern part of the Noe Valley and goes through the Bernal Cut area between the steep slopes of the Bernal Heights and Diamond Heights. South of I-280 the corridor proceeds through the Excelsior District along the slope of the McLaren Park and Outer Mission towards the Ingleside community. The Westwood Park and Glen Park neighborhoods adjoin the north side of I-280 between the Ingleside and the slopes of the Diamond Heights area. The largest nonresidential land uses in the corridor include City College, Balboa Park, the Muni Metro Center, Balboa High School, the Jewish Home for the Aged and the I-280 freeway. John McLaren Park is located just east of the Excelsior District.

c. San Jose Avenue Alignment

The primary land uses adjoining the 30th Street segment of the San Jose Avenue Alignment consist of two-story detached and attached single- and two-family homes. As the Alignment turns the corner from 30th Street onto San Jose Avenue, it is bordered on the west by the rear yards of a row of two-story attached single- and two-family homes between 30th and Randall Streets. The east side of the street is bordered by the front yards and entrances to attached single- and two-family structures. As the alignment proceeds into the Bernal Cut area it is adjoined on the northwest by the base of the Diamond Heights ridge and on the southeast by the base of the Bernal Heights slopes. The segment of the alignment in the Bernal Cut area (from about Appleton Avenue to east of the I-280 underpass) takes on the characteristics of an exclusive transportation corridor due to the nature of the topography, the open space along the adjoining slopes, the absence of adjacent commercial or residential uses and general proximity to I-280. The right-of-way of San Jose Avenue includes a bicycle path which parallels the north side of the street. Due to the steep slopes bordering this segment of the alignment, residential properties are located approximately 50 to 70 feet above San Jose Avenue and back from the roadway.

The closest residential structures to this segment of the alignment are located on Bosworth Street overlooking San Jose Avenue.

West of the I-280 underpass to Pilgrim Avenue, the I-280 freeway is located adjacent to the north side of San Jose Avenue. There are single-family attached and detached homes along the south side of San Jose Avenue from the underpass to Ocean Avenue. The George Washington Masonic Hall is located at the corner of San Juan Avenue on the south side of the alignment. There is a fairly new apartment building with about 20 units on the north side of the street between Pilgrim Avenue and Baden Street. West of Pilgrim Street on the north side of the street is a mix of attached single-family structures, apartments and some commercial uses near Santa Ysabel Avenue. The Community Assembly of God, Medical Dental Building and Shell Oil are all located near Santa Rosa Avenue.

Further west, between Havelock Street and Ocean Avenue, is Balboa Park and swimming pool and the Ingleside Police Station. Balboa Park, the Muni Metro Center and the Balboa Park Bart station are the land uses adjoining Ocean Avenue south of the I-280 freeway. The land uses adjacent to the east side of San Jose Avenue south of Ocean Avenue include attached homes, the San Miguel School of Bilingual Education, a coffee shop, the old Muni carbarn and the Turko Persian Rug Company.

d. Monterey Boulevard Alignment

Land uses adjoining the Monterey Boulevard Alignment from 30th Street and San Jose Avenue to approximately Roanoke Street in the Bernal Cut area are the same as those adjoining the San Jose Avenue Alignment in the same area.

The Monterey Boulevard Alignment departs from San Jose Avenue at approximately Roanoke Street, and proceeds along the north slope of San Jose Avenue and I-280 to Monterey Boulevard. Land use along this segment includes San Jose Avenue and the I-280 freeway on the south and primarily single-family homes along the north side of Circular Avenue. A few commercial uses are located near the intersection with Mangels Avenue.

Along Monterey Boulevard between Circular Avenue and Foerster Street the adjacent uses consist of a mix of condominiums, apartments and single-family homes, primarily on the north side of the street, and attached single-family homes on the south side of Monterey Avenue between Acadia and Baden Streets. Several commerical uses, the largest of which is a Safeway store, are located between Foerster and Gennessee Streets in addition to single-family and attached residential. There are several commercial uses at the intersection of Gennessee Street and Monterey Boulevard.

The segment of Gennessee Street from Monterey Boulevard to Judson Avenue is bordered by attached single-family homes. At the Gennessee Street and Judson Avenue intersection, San Francisco City College is located to the south of Judson Avenue and Riordan High School is located on the east side of Phelan Avenue north of Judson. From the high school to Ocean Avenue, the other uses along Phelan Avenue include City College on the east and the old water reservoir areas on the west (currently used for City College surface parking). South of the reservoir is the California Book Store and a San Francisco Fire Department Station on the corner of Phelan and Ocean Avenues.

e. Mission Street Alignment

The majority of the Mission Street Alignment occurs along a commercial strip with some institutions, apartments and attached single-family structures scattered along the route. Access for this neighborhood commercial district is provided by foot, transit, and automobile. Most businesses are small and provide no off-street parking.

The segment of the Mission Street Alignment from San Jose Avenue to Randall Street is adjoined by some single-family attached homes on 30th Street, a Chevron gas station and the 30th and Mission Market located on the southwest and northwest corners of 30th and Mission Streets, respectively. From 30th Street to Randall Street there are several commerical establishments, most with apartments above. At the intersection of Mission and Randall Streets a Shell gas station is located on the north side of the Alignment.

As the Alignment proceeds west toward the I-280 overpass there are a variety of scattered commercial and two- and three-story apartment buildings along each side of Mission Street. At the Mission Street/College Avenue/Crescent Avenue intersection is the main entrance to the Saint Mary's Park residential area. This is a cohesive and established neighborhood of single-family detached homes bordered by the I-280 freeway on the west, by Crescent Avenue on the east and by Mission Street on the north. Some residential, commercial and institutional uses occur along the Mission Street side of this neighborhood, including the St. John's School for Girls near Bosworth Street and the Mission Street YMCA located on the north side of Mission Street near Bosworth Street. The segment of Mission Street from south of the I-280 freeway to Ocean Avenue has densely commercial use. The most prominent institutional land use occurring in this segment is the Jewish Home for the Aged and Disabled, located between Silver and

Avalon Avenues on the east side of Mission Street. This facility was one of the first buildings in the area and it was incorporated on the eight-acre site in 1889. The current resident population is 335. An 82-bed addition under construction east of the existing building is scheduled to open in late 1982. At Cotter Street not far from the Jewish Home for the Aged is the Social Security Office located on the east side of Mission Street. The Excelsior Branch Library is on the west side of the street.

Along Ocean Avenue from Mission Street to San Jose Avenue there is a mixture of residential and commercial uses. Most of the residential is single-family attached with some apartments located above commercial uses on the ground floor. Some of the commercial uses along this segment include: the Bank of America and Alex's San Francisco Health Club, between Persia Avenue and Alemany Boulevard; the Discovery Center School and Midas Muffler between Cayuga Avenue and Alemany Boulevard; and the Carpet Corner, Dome Construction and the Brentwood Market, between Otsego Avenue and San Jose Avenue.

2. Urban Design and Visual Quality

The proposed Muni J Line Connection would pass through a well-established urban portion of San Francisco and would use the existing street pattern and rights-of-way. This portion of the City is primarily residential, with heavy commercial development along Mission Street. The majority of residences are two-story single-family units, although some mid-rise apartment buildings are interspersed in the area. Most of the structures are built up to the sidewalk's edge with no vegetation buffer between the street and the living quarters. Like many residential structures in San Francisco, the ground floor of such buildings is generally used as garage and utility areas, with living quarters on the second floor. Because of this type of architectural design, the overall views of the street or the City from the higher levels becomes an important and pleasing feature of the structures. The visual quality of these views, and the amount of obstruction by existing utility lines and structural supports, varies along each of the three proposed alignments.

a. San Jose Avenue Alignment

The proposed San Jose Avenue Alignment would follow San Jose Avenue north from the Metro Center. The first three quarters of a mile of this route has a residential quality. Balboa Park, with its expansive lawn and mature Monterey cypress, is sited on the west

[illegible] of San Jose Avenue. The east side of this portion of the route is lined with single-family residences. Views from the second-story living quarters of these residences look [illegible] into the park. They are only slightly obstructed by the utility poles and wires on the west side, and the street lights that line the park's edge. Upon reaching I-280, San Jose Avenue goes through an underpass and continues 50 to 70 feet below the surrounding neighborhood for approximately three quarters of a mile. Textured retaining walls, and planted slopes and median add visual interest to this portion of the street. Street lights with underground wires line both sides of San Jose Avenue. The Glen Park BART station lies on the west side of San Jose Avenue along Circular Avenue, a pedestrian overpass crosses San Jose Avenue to allow pedestrian access. North of the intersection of San Jose Avenue and Dolores Street, residences line both sides of the proposed route. Views from the second-story living quarters of these residences are typical short-range urban views of streets and buildings generally obstructed by other structures. By burying all utility wires on this portion of San Jose Avenue, the visual presence of utility wires clutter often associated with urban views has been removed. Street lights placed in the center concrete median are the only vertical elements in view along the avenue. The proposed alignment would travel westward on 30th Street to join with the existing Church Street terminus. Thirtieth Street is a narrow street, lined on both sides with single-family residences and mid-rise apartments. Utility poles carrying three sets of wires line the north side of the street and are within the field of view from the second-story living quarters of residences.

b. Monterey Boulevard Alignment

The proposed Monterey Boulevard Alignment would follow the existing K Line streetcar tracks along Ocean Avenue to Phelan Avenue at the west end of the City College of San Francisco. Phelan Avenue is a broad avenue with a center median, bordered to the east by the planted edge of the City College campus and to the west by a sunken parking area and Riordon High School. Street light standards are the only vertical element along the street, resulting in a visually uncomplicated avenue. The alignment would turn on Judson Avenue, then travel northward along narrow Gennessee Street through an area of single-family residences. Views from the second-story living quarters of these residences include the utility wires and vertical wire supports that line this street. After reaching Monterey Boulevard the proposed alignment would travel westward along this broad avenue. Monterey Boulevard is lined on both sides with apartments and single-family

residences. The center median along the length of Monterey Boulevard is planted with shrubs and groundcovers adding visual interest as well as separating the directions of travel. Views from the second-story living quarters along this avenue are typical of urban views; however, they do not include utility wires or support poles since utility wires are buried in this area. After reaching Circular Avenue, views from the second-story living quarters become longer-range across I-280 southeast toward nearby hillsides, including McLaren Park. The views do not include utility lines since the wires are buried in this portion. From Circular Avenue the proposed alignment would follow the San Jose Avenue Alignment discussed above.

c. Mission Street Alignment

The proposed Misson Street Alignment would follow Ocean Avenue east from the Muni Metro Center. This Alignment is currently the route for electrically powered buses and is lined with the overhead electric wires necessary for the buses' power system. This portion of Ocean Avenue is predominantly commercial, with some residential apartment structures interspersed. Views from the structures along Mission Street are restricted urban views confined by the structures that line it. At Mission Street, the proposed alignment would travel northward for three quarters of a mile through the Outer Mission commercial shopping district (Figure 4, page 22). Apartments and single-family units interrupt the predominant commercial use north of the I-280 overpass for approximately one quarter of a mile. Views from these residences are typical urban views of streets and buildings, interrupted more by the proximity of other structures than by the existing power line system for the buses. North of Randall Street, Mission Street becomes a predominantly commercial street once again. At 30th Street the proposed alignment would travel westward along the same route as the proposed San Jose Avenue Alignment to meet the existing Church Street terminus.

B. SOCIOECONOMIC CHARACTERISTICS

1. Population

The population within the project corridor has been very stable during the past ten years (population net increase of 84 persons) and is expected to remain so in the future. In comparison, overall population within the City declined 5.1% (36,700 people) between

3. Economic and Fiscal

San Francisco Municipal Railway budget for the 1981-82 fiscal year is $142,321,686.[5] This represents an increase of approximately $18.0 million over actual expenditures in the 1980-81 fiscal year. The proposed budget for the 1982-83 fiscal year represents an additional $16.0 million increase. The sources of revenues are shifting toward farebox revenues and local operating assistance and away from state and federal subventions. In the 1980-81 fiscal year, state and federal subventions accounted for 28% (14% each) of the budget and would constitute 22% of the proposed 1982-83 budget. In its five-year plan, Muni estimates the proportion of the budget defrayed by state and federal sources will decline to 16% by 1986-87. Farebox revenues have fluctuated between 33% and 40% of the budget in recent years and are required to remain at not less than 33% by AB1107. Given this distribution of federal, state and farebox revenues, and a reasonable growth in general fund revenues, a deficit is projected in 1986-87 which would have to be made up by as yet unspecified local sources.[6]

C. TRANSPORTATION

1. Traffic Conditions

a. General Conditions

The J Line Connection Corridor includes San Jose Avenue and roughly parallel streets between 30th Street and Geneva Avenue. In the north the corridor is narrow where it passes through a gap (known as the Bernal Cut) between the steep slopes of Bernal Heights and the Diamond Heights ridge of Twin Peaks. In the south it widens out into the Outer Mission, Sunnyside, Ingleside and Excelsior Districts, which occupy the valley between the moderate slopes of University Mound (McLaren Park) and Mount Davidson. This topography funnels traffic from the southern third of San Francisco and the west side of northern San Mateo County through either the gap or the Islais Creek Valley between Bernal Heights and University Mound. San Jose Avenue, which occupies an old Southern Pacific Railroad right-of-way in the Bernal Cut, and Mission Street serve traffic in the gap, while the I-280 freeway (which also utilizes an old railroad right-of-way) occupies the Islais Creek Valley.

There are two entrances/exits to I-280 in the J Line Connection Corridor: a modified diamond interchange at Geneva and Ocean Avenues; and a four-level interchange at Glen

Park with ramps connecting between southbound I-280 and Monterey Boulevard to the west, between northbound I-280 and San Jose Avenue to the north, between Monterey Boulevard to the west and San Jose Avenue to the north, plus a through connection for San Jose Avenue. Both freeway entrances are adjacent to BART stations: Balboa Park Station at Geneva/Ocean Avenues and Glen Park Station at Monterey Boulevard/San Jose Avenue. The result is that during peak hours the heaviest traffic volumes on the surface streets in the corridor are associated with these freeway entrance and BART station areas. Muni transit routes converge at the stations; thus buses and Muni Metro vehicles as well as pedestrians and kiss-and-ride patrons all contribute to the congestion at these areas. BART has proposed and received approval from the City of San Francisco for a kiss-and-ride lot for the Glen Park BART station, which would help mitigate congestion around this station.

Traffic Volumes. The I-280 freeway, built in the 1960s, handles most of the through travel. Figures 5 and 6, pages 33 and 34 show daily and p.m. peak hour traffic volumes in the corridor. In 1979 the freeway carried 133,000 vehicles on an average day (called average daily traffic and abbreviated ADT) between Ocean and San Jose Avenues and 125,000 ADT east of San Jose Avenue. San Jose Avenue north of I-280 to Randall Street functions as an expressway branch of the freeway carrying 38,000 ADT (1976 count). Both the freeway and San Jose Avenue in this section flow freely, except that the a.m. peak traffic in the eastbound lanes of I-280 backs up from the US 101 merge. This results in an imbalance in traffic flow on both Mission Street and San Jose Avenue in the Bernal Cut, with the a.m. peak northbound flow heavier than the return southbound flow in the evening. This daily directional split is 53 to 47 on San Jose Avenue and 60 to 40 on Mission Street.

b. San Jose Avenue Alignment

Appendix C, page A-9, inventories the existing street conditions and traffic volumes along the San Jose Avenue Alignment and for the subalternative, the Dolores Street Alignment. The traffic conditions segment by segment are:

- 30th Street is one lane each way plus parking; travel volumes are light.

- San Jose Avenue from its merge with Guerrero Street to the I-280 on/off ramps has three travel lanes separated each way by a median. (There are four traffic lanes in the short section between Dolores Street and 200 feet south of Randall Street.) Parking is not permitted on San Jose Avenue south of Dolores Street, except for an 800-foot stretch northbound between Rousseau Street and St. Mary's Avenue. Traffic volumes range from 29,000 ADT at 30th Street to 38,000 ADT in the Bernal Cut.

  The section of San Jose Avenue south of Randall Street functions as an expressway. It has a median, no crossing intersections, two grade-separated street crossings (Highland Avenue and Miguel Street), a grade-separated pedestrian crossing (Cuvier Street), freeway-style on-off ramps, freeway-style overhead signs, limited access and parking, and a 45-mph speed limit which was observed to be regularly exceeded.

- San Jose Avenue between the I-280 ramps and Theresa Street has one lane each way plus a center median. In this transition area between the expressway conditions to the north and the regular surface arterial to the south, San Jose Avenue makes an S-curve through the I-280 undercrossing. The geometry of this curve limits actual speeds (southbound) to 40 to 45 mph on the first curve and 30 to 35 mph on the second curve.

- San Jose Avenue between Theresa Street and Ocean Avenue is four lanes with parking on both sides. Traffic volumes are in the 10,000-ADT range. This section operates as a minor arterial and occasionally receives overflow from the freeway.

Traffic Signals. The two traffic signals on San Jose Avenue at 30th and Randall Streets are part of the Army-San Jose coordinated traffic signal system, which provides progressive traffic flow along Army Street, Guerrero Street and San Jose Avenue. This system of progressive signal timing has 80-second cycles in the peaks (7-8:30 a.m. and 4-6 p.m.) and 60-second cycles off-peak. Green time favors San Jose Avenue.

The other two traffic signals on San Jose Avenue (at Santa Rosa and at Ocean Avenues) operate independently. The Santa Rosa Avenue signal has a 55-second cycle and Ocean Avenue a 65-second cycle. Green time at both signals favors San Jose Avenue.

Figure No. 6 SOURCE: Division of Transportation, Bureau of Engineering, Department of Public Works, City and County of San Francisco.

Bicycle Lanes. A two-way bicycle path shares the west side of San Jose Avenue through the Bernal Cut between Randall and Arlington Streets. This 10-foot-wide lane on the original street pavement is separated from San Jose Avenue traffic lanes by asphalt curbs. It is classified as a signed, Class I (off-road), bike path in the Transportation Element of the San Francisco Master Plan. The bike path is littered with trash and broken glass. The bicycle path is lightly used: A 1976 count observed four bicycles in the p.m. peak hour, and a count in May 1981 observed the same number. In the Master Plan, 30th Street is designated as a signed bikeway between Sanchez Street and San Jose Avenue, and between 30th Street and the north entrance to the San Jose Avenue bike path. Dolores Street southbound, and Randall and Chenery Streets northbound are also designated as signed as bikeways.

c. Monterey Boulevard Alignment

Appendix C, Page A-9, inventories the existing street conditions and traffic volumes for the Monterey Boulevard Alignment and for the subalternative, the Dolores Street Alignment. A general description segment by segment follows:

- Traffic conditions along 30th Street and San Jose Avenue from its merge with Guerrero Street to the I-280 on-off ramps are as described for the San Jose Avenue Alignment (Section III.C.1.b., page 35).

- The Monterey Boulevard on/off-ramps are single lane at the merge with San Jose Avenue but widen to two lanes at the intersection with Circular Avenue and Diamond Street.

- Circular Avenue carries approximately 16,000 vehicles daily. Between Diamond Street and Monterey Boulevard it is a four-lane street connecting the Glen Park Area and the Monterey Boulevard/San Jose Avenue on/off-ramps to the I-280 westbound on/off ramps, to Monterey Boulevard and to the remainder of Circular Avenue to the south. Parking is allowed only on the north side.

- Monterey Boulevard between Circular Avenue and Gennessee Street has 4 traffic lanes plus parking in some locations. Monterey Boulevard is one of the few east-west arterials in the southern part of the city, and it serves as a freeway connector for trips originating as far west as Sloat Boulevard and the West Portal

area. It carries about 13,000 vehicles per day. The street contains a barrier median, sidewalk bulbs for some of the eastbound bus stops and for some of the crosswalks, and curb cuts for parking and planting when possible. Buses stop in the outside lane both east and westbound. The street is hilly, with the steepest grade of 7.9 percent between Edna and Foerster Streets. The intersections of Edna and Baden Streets are four-way stops. The Safeway supermarket midway between Gennessee and Foerster Streets has midblock access.

- Between Monterey Boulevard and Phelan Avenue the J line could be routed over several streets. The streets in this residential neighborhood tend to be narrow -- most have a 60-foot right-of-way with 12-15 or 20-foot sidewalks, so the pavement widths vary from 30 to 40 feet; however, with eight-foot parking lanes on both sides, the travel way is limited to approximately 14-24 feet wide. Due to the proximity of City College, the parking supply tends to be saturated. Grades in excess of nine percent would limit the possible LRV alignments through this neighborhood to Gennessee Street or a combination of Gennessee/Judson and Foerster/Staples or Flood.

- Judson and Phelan Avenues front San Francisco City College and Riordan High School, which are primary traffic generators for these streets. San Francisco City College has a total population of 28,000 students evenly split between day and night classes, 1,000 faculty members, and 330 staff and administrative personnel. Riordan High School has approximately 1,000 daytime students and 60 staff and faculty. Both Judson and Phelan Avenues are 58 to 60 feet wide. Phelan Avenue, which has 13,000 ADT at Ocean Avenue, has an erratic flow pattern with surges based in large part on class schedules. During peak class-change periods, heavy congestion sometimes occurs, particularly where vehicles enter and leave parking lots. There are heavy pedestrian flows across Phelan Avenue both to and from the parking lots and to the transit vehicles.

- Ocean Avenue between Geneva and the Muni Metro Center entrance (opposite the eastbound I-280 on-ramp) is a major arterial with 4 lanes of traffic and LRV tracks in the median. It carries about 10,000 vehicles daily.

Traffic Signals. Section III.C.1.b., page 35, describes the two traffic signals on San Jose Avenue at 30th and Randall Streets.

The traffic signal at Diamond Street, Circular Avenue and the San Jose Avenue on/off ramps normally operates as a flashing red for the off-ramp and flashing yellow for Diamond Street and Circular Avenue. A pedestrian-activated signal provides a protected walk phase for the Diamond Street crosswalk.

The three-phase fixed-time traffic signal at Circular Avenue, Monterey Boulevard and the I-280 on/off ramps functions well.[7] After installation this signal was reconfigured and the I-280 off-ramp restriped to two lanes to prevent queues of cars from backing out onto the freeway.

The two traffic signals on Monterey Boulevard at Foerster and Gennessee Streets are timed to provide an 18-mph speed between them; this has helped reduce speeding along Monterey Boulevard.

Phelan and Geneva Avenues form an offset intersection with Ocean Avenue, necessitating a complex signal timing strategy. The central area of the intersection on Ocean Avenue is utilized as a "storage" area for vehicles from Phelan Avenue bound for Ocean Avenue eastbound, and for vehicles from Geneva Avenue bound for Ocean Avenue westbound. The capacity of this storage area is a critical factor in the signal timing. As currently configured, the most serious problem is the left-turn from Ocean Avenue (eastbound) to Phelan Avenue. Vehicles accessing City College via this left turn often have to wait through several signal cycles. Moreover, vehicles in the left-turn lane block eastbound LRVs. To improve this situation, a bypass road has been proposed by the Department of Public Works in the abandoned streetcar turnaround. The new roadway scheduled for construction in 1983, would connect Phelan Avenue just south of the bookstore with Ocean Avenue at Lee Avenue, thus moving the left-turn movements away from the Phelan/Ocean Avenue intersection to Lee Avenue.[8]

Due to the minimum of cross traffic, the traffic signal at Ocean Avenue and Howth Street functions well.[9] The LRV-activated traffic signal at the entrance to the Muni Metro Center protects the Muni Metro trains during pull-in and pull-out maneuvers. A train-length detector adjusts the length of the LRV phase to minimize inconvenience to motorists.[9]

Bicycle Lanes. For a description of the two-way bicycle path along the west side of San Jose Avenue through the Bernal Cut, see Section III.C.1.b., page 36.

i. Mission Street Alignment

Appendix C, page A-9, inventories the existing street conditions and traffic volumes along the 30th Street/Mission Street/Ocean Avenue Alignment. The traffic conditions segment by segment follow:

- 30th Street has one lane each way plus parking and curb bus stops; traffic volumes are light.
- Mission Street between 30th Street and Ocean Avenue has four traffic lanes. Traffic is moderately heavy (17,000 to 22,000 ADT), and transit volumes are heavy (39 to 43 buses per hour in the peak direction in the peak period). There is parking in most locations, and in the Excelsior District there is moderately intense commercial activity.

The street pattern along this section of Mission Street is chaotic, since the original San Francisco grid system stops at Bernal Heights. Most of the side streets are narrow and form T intersections with Mission Street. Moreover, except for the Excelsior District, there is no grid pattern to buffer the traffic flows; consequently, left turns are allowed at all locations. There are only two left-turn pockets: northbound at Randall Street and southbound at Trumbull Street (the I-280 freeway entrance). The numerous T intersections mean that local trips crossing Mission Street often require a zig-zag pattern, with the middle leg of the trip along Mission Street.

Between Cortland Avenue and Excelsior Avenue, traffic generally flows well, except from Cortland Avenue north and within the Excelsior commercial area, where there is often light to heavy traffic congestion.

- Ocean Avenue between Mission Street and San Jose Avenue is a generous two-lane, 40-foot-wide street. With 12,000 ADT, the traffic flows well, with the principal source of delay at the three signalized intersections which are unconnected (Mission Street, Alemany Avenue and San Jose Avenue).

Traffic Control. The 30th and Dolores Street intersection is a four-way stop. The 30th Street/San Jose Avenue traffic signal, part of the Army-San Jose traffic signal system, is described above in Section III.C.1.b. The 30th Street and Mission Street traffic signal is part of the Middle Mission traffic signal system (Precita Avenue to Cortland Avenue). As with the San Jose Avenue signal system, the Middle Mission has a 60-second off-peak and 80-second peak cycle length, but the two systems are not coordinated. The Cortland Avenue and Mission Street signal is coordinated with the one at 30th Street. A pedestrian-activated signal at Appleton Avenue does not belong to any signal system. From Richland Avenue south all the traffic signals are part of the Outer Mission system, including those at Richland Avenue, Bosworth Street, Trumbull Street, Silver Avenue, Excelsior Avenue, Norton Street/Brazil Avenue, and Ocean Avenue.

The spacing of these signals allows for excellent two-way traffic progression. The Ocean Avenue and Alemany Boulevard traffic signal is isolated (unconnected) and favors Alemany Boulevard, and likewise the Ocean Avenue and San Jose Avenue traffic signal is isolated and favors San Jose Avenue.

2. Transit Conditions

a. Existing Transit Service

Routes. The existing Muni and BART routes within the J Line Connection Corridor are shown in Figure 7, page 41. The J-Church Muni Metro (LRV) route currently operates between 30th and Church Streets and the Embarcadero Station at the foot of Market Street. The route operates on Church Street between 30th Street and Duboce Avenue, where it joins the N-Judah line to enter the Muni Metro Market Street subway.

The parallel Muni routes that would potentially be affected by one or more of the J Line Connection alternatives are the:

- 26-Valencia motor coach, which serves the outer part of San Jose Avenue.
- 9-Richland trolley coach on Mission Street north of Richland Avenue. In the 5-year Plan the 9-Richmond is scheduled to be discontinued.
- 12-Ocean trolley coach on Mission Street and Ocean Avenue.
- 14-Mission trolley coach on Mission Street.
- 14GL-Guerrero Limited and the 14X-Mission Express peak-hour only motor coaches that serve the Outer Mission. Both lines are scheduled to be abandoned when Muni Fast Pass is accepted as fare on BART.

with feeder mains connecting to it at each intersection. An eight to six-inch main runs beneath the north side of Ocean. There is a major network of mains at Ocean and San Jose Avenues.

h. Sewer/Storm Water Drainage

Side sewers and major sewers lines are generally buried at least eight feet below the surface; thus, construction and operation of any of the alignments would not affect sewer lines.[11] However, manholes located along the proposed alignments would require relocation, the cost of which would be paid by Muni. Field checks would be required to determine the locations of manholes.

C. TRANSPORTATION IMPACTS

1. Impacts on Traffic

a. Impacts Common to All Build Alternatives

With six-minute headways the J Line Connection would be expected to have minimal impact on traffic flow on streets where it would share the right-of-way with the regular traffic. The principal impacts would be at car stops and areas where special traffic signals are required for LRV turning movements.

Car Stops. For all the build alternatives, with the exception of the section within the Bernal Cut, the Muni Metro car would share a traffic lane with other traffic. To avoid the side friction or conflicts with parked vehicles including double-parked, badly parked or oversized parked vehicles, the LRVs would run in the center lanes. For the safety of patrons boarding or leaving LRVs, therefore, for those street sections with high traffic volumes and with four or more traffic lanes, it is envisioned that low-level station platforms would be built at stop locations. The heavy traffic sections are: San Jose Avenue north of I-280, Mission Street, Monterey Boulevard, Phelan Avenue, and Ocean Avenue east of San Jose Avenue.

The difficulty with a mid-street car-stop platform is that most street sections lack adequate width to accommodate such a platform in addition to moving traffic and parking lanes. Thus, unlike buses, which can pull out of the traffic lanes at stops, the LRV would typically block one moving lane when loading or unloading. In street sections where the

line would replace the local bus station, such as San Jose Avenue south of Baden Street, the loss of parking spaces due to the station platform may be partially balanced by parking spaces gained by eliminating the bus stop. Even if the LRV stops at an existing bus stop the two-car LRT platform is typically double the length of most bus stops and so may require more parking spaces.

For streets where a bus route and Muni Metro would both operate, such as at 30th Street, Mission Street, Ocean Avenue, Monterey Boulevard and Phelan Avenue, the options are:

- Have the buses use the car-stop platform. Transit patrons waiting for either the bus or the LRV could wait at one spot and not have to run back and forth depending on which comes first. This would improve the effective headway and pedestrian safety as well as simplify transfers between lines. Since both buses and LRVs could stop at the island, the middle lane of traffic would be blocked more often. Buses and LRVs operating in the same lane would potentially interfere with each other.

- Have the bus and car-stop platforms side by side. This would reduce the number of parking places taken and simplify transferring between lines. However, if a bus and an LRV were to stop simultaneously, they may completely block the street. Also, transit patrons may run between the island and the curb bus stop through moving traffic. A number of pedestrian accidents of this type on Market Street have led to the current policy of staggering the bus and car-stops.

- Stagger the bus and car-stop on opposite sides of an intersection (one nearside and the other farside). Thus, there would never be a complete blockage of traffic flow. This could potentially double the number of parking spaces to be removed. Waiting transit patrons would either have to choose which type of vehicle they were going to take (thus reducing the effective frequency of transit service) or run across an intersection in order to take full advantage of the transit headway. Since the traffic signal is green for only one crosswalk at a time, the patron must either anticipate a full cycle in advance (50-80 seconds typically), predict which vehicle will come first or cross one or the other of the streets illegally. This discourages transferring between lines.

- Bulb the curb and sidewalk out to meet the LRV tracks. This would be the safest option for pedestrians since on a sidewalk they are less likely to be hit by careless drivers than pedestrians standing on an island. Both buses and LRVs could use the bulbed stop, thus improving the effective headway. This solution would have the least on-street parking effect, since the pull-in or pull-out space for the buses would be eliminated. This feature would work only for two-lane streets, and traffic would be completely blocked when a transit vehicle is stopped.

- Run the LRV along the curb. Pedestrian safety and effective headways would be the same as for bulbing. This solution would require elimination of all parking, standing or loading along the curb. This would be considered acceptable when parking is already not permitted.

Tracks in Pavement. Where the J Line Connection tracks share the right-of-way with motor vehicle traffic, the tracks in the pavement would create the following hazards for all build alignments:

- In wet weather the tracks would be more slippery than the regular pavement, creating a possible hazard for automobiles, pedestrians and bicyclists.

- At dips and downgrades the LRVs throw sand, which may pile up and make the street more slippery for motor vehicles.

- Bicycles and mopeds must avoid the tracks, since their narrow wheels can fall into the flange slot.

In cases where there are four or more travel lanes, motorists tend to avoid the track lane. This is in line with established policy to separate the LRVs and traffic where possible.

b. Impacts for San Jose Avenue Alignment

30th Street Segment. The LRV would block the traffic lanes during its stops at Dolores Street.

A new special LRV signal would have to be added to the 30th Street and San Jose Avenue traffic signal. Southbound, the LRV could turn right from 30th Street to San Jose Avenue during the regular 30th Street green phase. Northbound, the LRV would require a

separate phase, since both the southbound traffic and the 30th Street traffic must be kept out of the intersection during the LRV turn. With the tight-radius 120-degree curve, a two-car Muni Metro train would take approximately 33 seconds of green time to clear the intersection (a one-car train would take 23 seconds); thus, in the worst case during the p.m. peak the LRV phase would use seven seconds of every six minutes of the critical southbound traffic green signal. This represents a three percent loss of capacity for southbound San Jose Avenue traffic or change from a volume/capacity ratio of .86 to .89, both in the D level of service range (see Appendix C, page A-12 for a description of levels of service). Thirtieth Street would lose in the worst case one out of every four and one-half traffic signal cycles, and change from a volume/capacity ratio of approximately .5 to .6, or a level of service B to C.

The geometrics of the 120-degree left turn, San Jose Avenue to 30th Street, would require removing part of the median island on the south side of the intersection. For pedestrian impacts see Section IV.C.3.b, page 107.

San Jose Avenue - 30th Street to Dolores Street Segment. The J line would share the center lanes with traffic between 30th Street and Dolores Street; south of Dolores Street, the LRVs would be in a separate right-of-way. A new traffic signal would be needed to separate the LRVs from the San Jose Avenue to Dolores Street left-turn northbound traffic movement.

San Jose Avenue - Randall Street Intersection and Station Platform. The major impact of a separate right-of-way for the J line south of Dolores Street on San Jose Avenue, and of a station platform at Randall Street, is that the existing four lanes of traffic each way would be reduced to three lanes each way. The impact would be to increase the level of congestion in both a.m. and p.m. peak hours in the peak direction from service level D to service level E.

San Jose Avenue - Randall Street to Glen Park. Between Randall Street and the Monterey Boulevard on/off-ramps, the addition of the Muni Metro right-of-way in the median would have no noticeable impact on traffic flow because the number of traffic lanes would remain the same (three each way). Between the Monterey Boulevard on/off ramps and the I-280 on/off ramps, the number of traffic lanes would be reduced to two lanes in each direction through the Bosworth Street undercrossing. Two lanes can easily handle the

2,000 southbound p.m. peak-hour vehicles. Northbound, the San Jose Avenue and I-280 off-ramp traffic would have to merge into two lanes instead of the existing three. In the a.m. peak hour, the 2,400 northbound vehicles in the merge would change from Level of Service C to that of D (see Appendix C, page A-12 for a description of levels of service for freeway conditions).

This may be viewed as consistent with the established policy in San Francisco to give preference to transit over private cars, as stated in the San Francisco Master Plan.

A modest reduction of the capacity of San Jose Avenue would make little difference in the origin-destination pattern in the northbound a.m. peak period as long as the I-280 freeway backs up (LOS E and F) in the morning eastbound towards US-101, and US-101 itself is fairly slow moving up to its junction with the Central Freeway. Collectively the motorists will in effect make very fine shortest travel time calculations and the traffic will spread out over all available roadways. For the "thru" motorists (those 60% going outside the Mission District)[12] the effect of a slightly slower speed in the San Jose Avenue section is small compared to the delays associated with the traffic signals and congestion in the Inner-Mission or the stop-and-go traffic on the freeway.

San Jose Avenue - Glen Park to Theresa Street. The existing single lane of traffic each way through the I-280 undercrossing would remain. With the Muni Metro tracks in the median, the geometry of the S-curve through the undercrossing would limit actual motor vehicle speed southbound to 25 mph, as opposed to the existing 30 mph.

Mitigation Measures. Mitigation measures will be implemented to maintain public safety through the S-curve underpass. Some of the measures under consideration include:

- Lane striping so that the through movement is onto the I-280 on-ramps, and that it takes a definite left turn to continue on San Jose Avenue.

- Overhead sign changes, and pavement markings to indicate to the motorist that a left-turn is required in order to continue south on San Jose Avenue.

- Sign that calls San Jose Avenue lane a 'ramp' and calls for a 25 miles per hour speed.

In order to improve the safety within the 'S' curve, the trackway would be deliniated by special raised paving, similar to the Judah Street treatment only with a lower pavement edge height. The median barrier would be retained in order to separate opposing traffic.

San Jose Avenue - Theresa Street to Ocean Avenue. The J Line Connection vehicles would share the right-of-way with automobiles from Theresa Street to Ocean Avenue. With six-minute headways, the LRVs would have minimal impact on traffic operation except at the station stops. Three stops are proposed: between Baden Street and Pilgrim Avenue and between Paulding Street and San Juan Avenue, with far-side stops at Ocean Avenue. The first two would have platforms one-and-a-half inches, which would delineate the pedestrian safety area while allowing the fronting residents to reach their driveways.

San Jose and Ocean Avenues Intersection. The Ocean and San Jose Avenues intersection signal would require a demand-actuated third phase for the LRV movement in or out of Muni Metro Center. In the a.m. peak hour, the traffic level of service would go from C to D, and in the p.m. it would remain at level of service C, if the J line terminates at the Metro Center. If the J and M lines are through routed, then there would be little impact on traffic flow since the LRVs would stay on San Jose Avenue and not enter Metro Center.

c. Impacts for Monterey Boulevard Alignment

30th Street Segment. Impacts for this and the following segments would be identical to those for the San Jose Avenue Alignment described above (see Section IV.C.1.b., page 84).

San Jose Avenue - 30th Street to Dolores Segment. See Section IV.C.1.b., page 85.

San Jose Avenue - Randall Street Intersection and Station. See Section IV.C.1.b., page 85.

San Jose Avenue - Randall to Glen Park. See Section IV.C.1.b., page 85.

San Jose Avenue Subalternative - J Line Right-of-Way in Outside Lanes, Dolores to Monterey. An alternate method of ramping up from San Jose Avenue to Monterey Boulevard in the Glen Park area would be to share the use of the existing Monterey Boulevard on/off ramps to San Jose Avenue. The tracks would then be on the outside (curb) lanes. For northbound tracks a special traffic signal phase would be needed to

protect the LRV when it crosses the northbound traffic lanes at either Dolores Street or 30th Street. Southbound, the LRV would enter the San Jose Avenue curb lane from 30th Street either via an S-shaped curve which would twice cross all the southbound San Jose Avenue traffic lanes, or via the existing Dolores Street entrance with San Jose Avenue.

With curbside right-of-way the LRV would have to share its right-of-way in the Bernal Cut because of safety issues associated with right turns southbound at the Arlington Street and Monterey Boulevard off-ramps, and northbound turning into or out of Rousseau and Milton Streets, St. Mary's Avenue and at Randall Street. The existing bicycle path would be retained.

Use of the curb lane as opposed to a median right-of-way would mean that the LRV station at Randall Street would use the sidewalk rather than an island, and the LRVs would share the outside fourth lane; consequently, the existing four traffic lanes for each direction on San Jose Avenue could be maintained. The bicycles and pedestrians waiting at the station would share the sidewalk. Thus the bicyclists would be required to walk their bicycles through this area. Southbound Dolores Street would continue to have its own lane. Traffic would be forced into three lanes when an LRV is standing at the stations, otherwise the LRVs would flow with the traffic. For the Dolores Street Alignment two all day parking spaces and four parking spaces with 4:00 to 6:00 p.m. tow-a-way zones would be lost.

In addition, 21 parking spaces would have to be removed northbound on San Jose Avenue between Rousseau Street and St. Mary's Avenue.

For the San Jose Avenue and 30th Street northbound alignment, the outside-lane subalternative would require eliminating all parking and standing in front of the residences between Randall and 30th Streets. An estimated 14 spaces would be lost on the east side of San Jose Avenue, and six spaces on the west side. Of the residential units affected by the loss of parking, two do not have off-street parking between Kingston Avenue and Brook Street, plus the ten units in the apartment house on the southeast corner of 30th Street and San Jose Avenue.

In the outside-lane subalternative, with the J line operating in the outside lanes in the Bernal Cut, the line would re-enter the surface street system via the San Jose

Avenue/Monterey Boulevard on/off-ramps and go through the Diamond Street/Circular Avenue intersection.

The two subalternative alignments, in the median lanes or in the outside lanes through the Bernal Cut, would require different ramping arrangements between San Jose Avenue and Monterey Boulevard/Circular Avenue. The outside-lane subalternative would use the existing ramps (structurally strengthened), while the median-lane subalternative would use new structures touching down directly at the Monterey Boulevard/Circular Avenue intersection. The first subalternative alignment would use one block of Circular Avenue between Diamond Street and Monterey Boulevard. For the outside lane subalternative the stations would be as follows:

- The inbound station at Circular Avenue and Diamond Street would be on the San Jose Avenue on-ramp and would occupy the left lane of the two lanes with a safety island between the right and left lanes. A new sidewalk on the east side of Diamond Street connecting to the existing off-ramp crosswalk and a new crosswalk across Circular Avenue would provide access to the pedestrian island. A new pedestrian-activated signal would be installed to help the pedestrians cross the Circular Avenue traffic.

- The outbound station would be on the San Jose Avenue off-ramp as a nearside curb stop at Diamond Street. The existing demand-actuated pedestrian-only signal phase to protect the Diamond Street crosswalk would be modified to include the LRV crossing. The pavement markings would indicate that the left-hand lane was for through traffic only, to help prevent motor vehicles from right turning in front of a stopped LRV. Curb parking would be prohibited on the north side of Circular Avenue. At both ramps the loss of a lane would change the level of service from A to B.

Circular Avenue/Monterey Boulevard/I-280 On/Off-Ramp Intersection. For the outside-lane subalternative, the inbound trains would use the present left lane of the double left turn (Monterey Boulevard eastbound to Circular Avenue northeastbound). The traffic impact would be minimal. Outbound trains would use the present right-turn channelization, but because the train must use the center lane on Monterey Boulevard, this movement would be prohibited during the Monterey Boulevard off-ramp (westbound) phase

of the traffic signal. The train movement would be allowed during the other two phases. Once every six minutes the existing free right turn could be temporarily blocked if the outbound LRV arrived during the off-ramp signal phase.

With the median lane subalternative the LRV approach would add a fifth leg to the Circular Avenue/Monterey Boulevard/I-280 ramp intersection. Intersection design constraints require that the stop bars for both the southwest-bound Circular Avenue approach and the I-280 off-ramp approach be moved back, thus increasing the size of the intersection and reducing its efficiency. Inbound LRVs would use the right-hand of the Monterey Boulevard to Circular Avenue double-left-turning lanes and the existing Monterey Boulevard eastbound signal phase. Outbound LRVs would require a special fourth signal phase, which would be substituted for the Circular Avenue green phase. The impact of the loss of one out of every five green phases would create only temporary backups for motorists on Circular Avenue because Circular Avenue has low traffic volumes and the length of the Circular Avenue green phase is at present determined by the needs of the crosswalk across Monterey Boulevard and not by the volume of traffic. The present fixed-timed traffic signal operation would be maintained (with the addition of a presence detector to extend a phase for two-car trains as needed).

Monterey Boulevard. Along Monterey Boulevard the principle traffic impact would be at the car stops (see Section IV.C.1.a., page 82). On four-lane streets, Muni prefers to install 150-foot-long loading islands to accommodate two-car trains. The platforms would restrict the street space and thus tend to slow motorists, as do the present stop signs. For the motorist, this would be an inconvenience, but for the residents, slower-moving traffic may be considered a benefit. When an LRV is at the car stop, traffic would be forced into the other moving lane.

Gennessee Street. Two-way LRV operation on Gennessee Street would require removing parking from one side of the street between Monterey Boulevard and Staples Avenue and from both sides of the street between Staples and Judson Avenues for a loss of 32 spaces. All residential units have off-street parking.

Other subalternatives in the section between Monterey Boulevard and Phelan Avenue are possible. Those which did not require banning parking would require implementing a one-way street pattern. Gennessee Street would be preferred because it does not have grades

higher than nine percent (as Foerster Street does, between Staples and Judson Avenues); it is the widest street, with pavement 36 feet wide in the section between Monterey Boulevard and Staples Avenue. Two-way use of Gennessee Street would minimize the width of narrow residential streets needed for the LRV alignment.

Judson and Phelan Avenues. Along Judson and Phelan Avenues between Gennessee Street and Ocean Avenue, the J line would operate down the center of 58 to 60-foot-wide two-lane streets. The street is wide enough to accommodate islands and generous lanes for through traffic if parking were banned next to the LRV platform. During City College class - change times, pedestrian crossings and automobile turning movements in and out of parking lots would create a safety hazard necessitating a reduction in the LRV speed. Vehicles turning left across the tracks to enter or exit the parking lots could conflict with LRV movements. Although San Francisco City College is a major trip end, the LRV would only marginally reduce traffic levels, since the 12 line already serves SFCC from the Mission District.

Phelan, Ocean, Geneva Avenues Intersection. Operation of J-line vehicles through the Phelan, Ocean and Geneva Avenues intersection would require modification of the traffic signals. A special signal phase to indicate the LRV right turn from Ocean Avenue onto Phelan Avenue would be activated by the track switch. Because the storage space on Ocean Avenue between Phelan Avenue and Geneva Avenue is not long enough to store a two-car train (it is long enough to store a one-car train), the Geneva Avenue approach traffic would lose one cycle whenever a two-car train was used on the J line. Since in peak periods the Geneva approach green phase is often fully loaded, the loss of a phase would mean that a queue would form and that a motorist may have to wait through several cycles before being able to enter the intersection. The added traffic load of a J line LRV would most impact the intersection in the early evening - i.e. 6-7 p.m., at start-up of the evening classes at City College. This would overlap the end of the p.m. rush hour (which creates a large westbound traffic flow on Geneva Avenue) and also would coincide with the pull-in time for the Muni Metro vehicles, at which time they would be most likely to be coupled into multiple car trains.

If, during the p.m. peak, the queue of cars on Geneva Avenue backed up southwards over the small hill, then some motorists would begin to detour via Howth Street to Ocean Avenue. Although Ocean Avenue would also be carrying heavy westbound loads, the

Ocean Avenue green phase could be lengthened to accommodate heavier loads. (The Geneva phase cannot be lengthened since it is restricted by the inner intersection storage space.) The overall impact would be to change from level of service D to level of service E.

Ocean Avenue. The J line LRVs would use the existing Muni Metro semi-exclusive right-of-way in the median of Ocean Avenue. The only traffic impact would be an increase in the number of LRVs using the special signal at the I-280 eastbound on-ramp to enter or leave Muni Metro Center.

If the J and M lines are through-routed, then this entrance would not be used by the J and M lines, though it still would be used by the K line. With the J-M through-routing, the LRV turn movements at Ocean and San Jose Avenues would occur during the regular signal phase. With six-minute headways, the impact of the J-M route would not be great.

d. Impacts for Mission Street Alignment

Thirtieth Street Segment. Impacts on this segment would be as described in Section IV.C.1.b., page 84.

Mission Street. The impact of Muni Metro tracks on Mission Street would be to widen the center lanes at the expense of the outside lanes. Currently the 58-1/2-foot pavement width has two 10-foot center lanes and two 19-foot 3-inch outer lanes. With eight feet needed for parking, the travel way in the outside lane is 11 feet 3 inches. Even so, depending upon the geometry of the bus stop and the size of the nearest parked vehicle, the 8½-foot-wide buses must often encroach on the center lane when pulling out of a bus stop. With 11-foot minimum distance between track centers and five feet minimum between the track center and the nearest moving traffic lane, the combined center lanes would be 21 feet wide, or 10-1/2 feet individually. The loss of one-half foot to the outside lanes would marginally impair the traffic flow in the outside lanes more than the gain of one-half foot would improve the flow in the center lanes. This would be due to the increased side friction from parked vehicles, the reduction in the side clearance needed by buses for smooth traffic flow, the reduction in clearance between moving vehicles and buses in bus stops, and the greater possibility that a bus would have to encroach on the center lane in order to pull out of a bus stop.

The presence of passenger-boarding islands would slow moving vehicles. This is desirable for the safety of the waiting passengers. The motorists, however, would perceive it as a hindrance, since they tend to avoid fixed objects. Thus, a 10-foot 3-inch center lane next to an island is perceived by the motorist as much narrower than a 10-foot 6-inch clear lane. With six-foot-wide platforms, the outer lane would be 14 feet from curb to island, with no parking allowed.

The traffic impact of the J line LRVs on four-lane Mission Street would be greater than if the equivalent number of buses were added. The buses, pulling in and out of the bus stops and generally moving slower than the vehicular traffic, tend to dominate the outside lanes. This, coupled with the friction associated with parking, would mean that traffic would travel, where possible, in the inner lanes. The exception is where left-turning vehicles block the center lanes, thus forcing the traffic back into the outer lanes.

An LRV running in the center lane would form a sight barrier for the drivers of following vehicles. These drivers would no longer be able to see vehicles waiting to make left turns and so would tend to avoid directly following an LRV. This problem is compounded at the LRV stop locations, at which an LRV would stop all traffic in the center lane. Thus the LRVs would tend to encourage motorists to travel in the outside lanes. Consequently, even though buses would tend to stay in the outside lane and would generally avoid running on the tracks in the center lane, buses and LRVs would interfere with each other's operation by effectively pushing motor vehicles into the other's lane.

Mission and 30th Streets Intersection. The geometrics of the outbound (southbound) LRV turn from 30th to Mission Street would require encroaching several feet onto the property on the southwest corner, a gas station, in order to make the right-turn. This would improve the capacity of the intersection as a whole and facilitate right turn movements. The required lengthening of the crosswalk would not require any change with the traffic signal timing.

Mission Street and Ocean Avenue Intersection. A right turn from the center lane on Mission Street to Ocean Avenue would require a separate signal phase as the LRV crossed the outside Mission Street traffic lane. The impact would be to reduce the southbound capacity at the Ocean and Mission traffic signal by approximately ten percent which would represent an estimated reduction in level of service from C to D. The left turn would not require any special provisions.

Ocean Avenue. Ocean Avenue is sufficiently wide to permit at car stops the separation of the motor vehicle travel lane from the LRV lane; however, this would require that parking at the car stops be removed from one side of the street, and that the car stops for opposite directions be staggered. Thus, from the through-traffic point of view, LRV operation would have little impact. On the average, five parking spaces would be lost per car stop.

Parking. LRV operation would have no impact on parking along 30th Street. The impact of LRV car stops along Mission Street would be the removal of the adjacent parking for the length of the 150-foot-long passenger islands plus, ideally, 150 feet more at either end as a taper to provide a smooth flow. With the generally short blocks in the area, one or both ends would be at the intersection so the taper would not be required, but parking for the full length of the block would be removed or approximately 15 spaces for a stop in both directions. At least one stop would be needed in the Excelsior shopping district, necessitating removal of meter parking.

The impact of LRV stops along Ocean Avenue would be the removal of parking alongside the LRV passenger island. Positioning the car stops at existing 12 line bus stops would minimize the parking take.

e. Impacts to No-Build Alternative

There would be no traffic changes under the No-Build Alternative.

2. Transit

a. Impacts Common to the Three Build Alternatives

Route Impacts. The Muni 1980-1985 5-year Plan is to through-route the J line (extended to Metro Center) with the M line to form a loop. An alternative is to have the J, M and K lines all terminate at the Metro Center. Because of speed restrictions inside the Metro Center, terminal loops within the Center take four minutes to make. The J-M loop line, in conjunction with the 54-Felton (along Sagamore Street and Alemany Boulevard), would replace the current outer part of the 26-Valencia route, and the 26 motor coach would be rerouted south of Glen Park BART station via Bosworth Street, Lyell Street, Alemany Boulevard and Silver Avenue to connect to Mission Street; plus a terminal loop east of Mission Street on Trumbull Street and Maynard Street. The 26 is also planned to operate

on Guerrero Street between 30th Street and Duboce Avenue rather than its present routing on Valencia Street.

Unlike the existing 26-Valencia routing, which terminates at San Francisco State University, its replacement, the J-M loop route, would provide direct access from the Mission and Ingleside Districts to Stonestown Shopping Center as well as to San Francisco State. Furthermore, unlike the existing 26-Valencia, the J Line Connection on San Jose Avenue would provide a direct line between the San Jose Avenue area with Noe Valley, lower Eureka Valley, the Duboce Triangle and the N line serving the University of California Medical Center and the Inner Sunset. However, with the J Line Connection, travel between San Jose Avenue area and the Valencia Street or the downtown section of Mission Street could require a transfer at 30th Street, which is not the case with the existing 26 route.

Route Changes. There are two distinct viewpoints with respect to changes in transit routes: that of the user and that of the public at large, which is similar to that of the transit operators.

From the transit operator's point of view as well as from that of the public, the long-run operational impacts would be central and critical. The San Jose Alignment would save in overall vehicle and operator hours while providing service to a new section of the route. This potential for savings is detailed on page 67. For all three alignments, the J and N line routes would bypass the West Portal and also have fewer reversals at The Embarcadero Station, thereby reducing the congestion at these critical points by a projected 78 car movements per day, thereby improving Muni Metro operation.

To obtain the full benefit of these potential savings for the N line, a left-turn track between Church Street and Duboce Avenue would be constructed (the right turn already exists).

From the point of view of the public and the transit operators, what matters over the long run is the increase in the total transit system's patronage, not how a particular line gains or loses riders. In the short run due to a route change there may be more or less crowding on a particular line or section of a line. In the interim, however, patronage levels and headways tend to balance out as new schedules are made.

For an existing or potential transit patron, the attractiveness of a transit trip to a destination is what matters. This attractiveness is a function of overall travel times and the degree of inconvenience associated with making the trip and the cost. Travel times are a function of walking distance, the time waiting for a transit vehicle (or the headways), the travel speeds and the number of transfers required. Research has shown that waiting time has a much higher subjective value than does riding time; hence the importance of short headways to attract maximum patronage. The degree of inconvenience associated with a transit trip is the number of transfers required, the length of the waiting periods required, and the sense of reliability (whether the transit vehicle would show up on time and whether the waiting patron may be bypassed because of overcrowded vehicles).

In the short run an existing user may experience the increase or decrease in patronage on a particular line due to a change in routing as an increase or decrease in crowding on the transit vehicle and/or as a slowing down or speeding up of the trip travel time. In the long run, however, the headways on a more crowded route will be improved; on the other hand, there will be pressure to lengthen the headways if a route is under-utilized. Consequently, from the user's point of view, increased patronage on a line is a mixed blessing: it means more crowding and slower trips but improved headways. In general, the added convenience of headway improvements outweigh the disadvantages; thus, the more heavily used transit route will have better headways and will attract even more ridership compared with a parallel line that does not have a frequent service. In San Francisco, examples of this phenomenon are the heavy use and good headways of the Mission Street lines versus the 26-Valencia, and, likewise, in the Richmond District, the heavy use and good headways of the 38-Geary versus the 31-Balboa or the 2-Clement.

In May 1982 the K and M cars were through-routed on Ocean and San Jose Avenues in order to eliminate the need to negotiate the runaround loop at Metro Center, which takes 4 minutes exclusive of stop time. The Muni 5-year Plan calls for through routing the J and M lines and it is anticipated that if the J line is connected that the K line would be terminated at Metro Center and the J and M lines through-routed, since this route has greater patronage potential than the K-M route. The other option, a J-K route, does not directly serve the Balboa BART station. The last option is for all routes to use the Metro Center station platforms.

With J-M through-routing potential a capital cost savings would be realized if the J line entrance to Metro Center at Ocean Avenue and San Jose Avenue were eliminated from the project. For the San Jose Avenue and Mission Street alignments, if this entrance were eliminated from the project it would be necessary to either rebuild the existing Metro Center entrance at Geneva Avenue or on Ocean Avenue to allow for the J line (and N line pull-in and pull-out) cars to exit and enter the Metro Center directly, or if this were not done a reversing movement would be necessary. J line-bound cars would have to use a reversing movement from the Metro Center loop to get onto the northbound track of the J-M routing on San Jose Avenue. This would require a flagperson and in all probability could add confusion to the intersection, especially for northbound vehicles. Reversing movements requires increased operating cost which over the long run may offset any capital cost savings.

One operational alternative for the J line would be to turn back every other car at 30th and Church Streets. The inner part of the route would thus have six-minute headways while the outer part would have 12-minute headways. This 12-minute headway would approximately match the current 10-minute peak-hour headway of the 26 bus (11-minute headway midday). Through-routing of the J and M lines would require that every other M car also be turned back at either the Metro Center or at 19th and Holloway Avenues where there is an existing switch back. This latter location is also a major destination (San Francisco State University).

Patronage Projections. The 1975-1977 Muni Planning, Operations and Marketing (POM) Study made computer-network-based patronage projections of the recommended transit network which became the basis for Muni's 5-year Plan route reorganization. The POM network did not include the connection of the J line, because it would have been outside the study's 5-year time frame and the non-capital-intensive route restructuring goal. Due to the interest in the J Line Connection, however, a manual estimate of the J Line Connection patronage was completed by the POM study staff, which extrapolated from the computer-network-generated factors and used the same patronage modeling procedure. The general stability of transit travel patterns in San Francisco (aside from growth in downtown office workers) means that the the POM-observed patronage projection remains the best available in lieu of a new on-board survey.

This patronage projection assumed:

- 30th Street & San Jose Avenue J line routing
- 26 bus line would not operate south of Glen Park BART Station
- Patronage would be essentially constant with respect to this corridor for the forseeable future. Six-minute headways for the J line in the peak periods
- BART major mode to Central Business District from San Jose Avenue corridor.

The patronage analysis was done for both the J line terminating at Metro Center and for a J-M loop line operation.

Use of the Muni Fast Pass for intra-San Francisco BART trips is tentatively scheduled to begin late in 1982. When and if this occurs, BART will function as an integral part of the Muni system and the added cost of using both BART and Muni will no longer deter joint trip making. Both the 14X-Mission Express and the 14GL-Guerrero Limited, peak-hour-only routes that serve the Outer Mission, are scheduled to be discontinued with the advent of the Fast Pass acceptance on BART. The patronage impact for the proposed J Line Connection of Fast Pass acceptance on BART, would not be expected to be great, since BART already carries most of the downtown trips from the San Jose Avenue corridor.

Patronage changes are estimated under the individual alternatives below.

b. San Jose Avenue Alignment

Neither the J line Connection to Metro Center nor the J-M loop routing under this alternative would duplicate any other Muni service, except for a short stretch along 30th Street and for the rerouted 26 buses between the Glen Park BART station and Mission Street and Silver Avenue.

Connections and Transfers. The J line would have a station stop at Randall Street, a short distance from the Mission Street trunk routes; this is anticipated to be a heavy transfer point.

Compared with the present transfer with the 26 bus at Bosworth and Diamond Streets, transfer between the J line and Routes 10, 44 and 52, or to BART from the San Jose

Avenue car stop next to the Glen Park BART Station, would require an additional 200 feet of walking distance, plus climbing a 20-foot stair.

Travel Times. The travel time for the J Line Connection between 30th and Church Streets to Metro Center (Balboa Park Station) is estimated to be 11 minutes. This is the same as the average time the 26-Valencia bus takes to travel between 30th/Chenery Streets and San Jose/Geneva Avenues. The Dolores Street Subalternative alignment travel speeds would average approximately half a minute faster (one-way) than the 30th Street and San Jose Avenue Subalternative alignment, depending on the direction of travel, the time of day and the details of the traffic signal phasing.

Table 11, page 100, compares the running times of the existing conditions with the proposed alternative for selected trip origin and destination pairs (called O-D pair). From the San Jose Avenue Corridor, travel to downtown via BART would be faster than any other transit route, even if a transfer is involved (see O-D pairs III, IV and V). From Metro Center (Balboa Park station), the K line would be faster than the J line (O-D pair III). From Inner Mission to San Francisco State College is shown in O-D pair VI. The six minute headways of the J-M line improve the total travel times over the 10 to 11 minute headway of the existing 26 line.

Patronage. The estimated change in Muni's total patronage due to the J line Connection via the San Jose Avenue alignment would be 1,200 to 1,500 additional daily riders if the J line Connection terminated at the Metro Center and 2,500 to 3,000 additional riders if the J and M Lines were through-routed. These figures represent anticipated new trips on Muni; the actual patronage on the J line Connection would be a combination of these new trips plus diversion from the 26 bus route. Due to the competive travel times of BART in this corridor these new riders are not primarily downtown oriented; therefore, it is not expected that additional vehicles would be needed at the J line's Duboce Portal maximum load point. Much of the increased ridership would be in the reverse peak direction towards SFSU and Stonestown.

This patronage estimate assumes that downtown commuters would continue to use BART where possible. The estimated increase in patronage would be due primarily to improved connections, the increased capacity to take surges of patrons from schools and colleges, the superior ride quality and overall attractiveness of the Muni Metro vehicle, and the